Russian Journal of Electrochemistry 2004 vol.40 N8, pages 864-867

Electrochemical amination in the system Ti(IV)-NH 2OH-C 6H 6: The efficiency of the process in a sulfuric acid solution containing an organic solvent

Lisitsyn Y., Kargin Y.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

Electrolysis of the system Ti(IV)-NH 2OH-C 6H 6 in an 11 M H 2SO 4 solution shows that using an organic solvent (acetic acid, acetonitrile) during cathodically initiated amination of aromatic substrates permits the production of aromatic amines with the overall yield by hydroxylamine reaching 91%. Due to a chain mechanism of radical substitution, the benzene amination in electrolytes containing 5 M CH 3COOH and 5.5 M CH 3CN terminates largely upon consuming 70-75 and 50-55% of the charge required theoretically for a one-electron process. The maximum efficiency of electrochemical amination is observed at low hydroxylamine conversions and the overall current efficiency for mono- and disubstituted products of the benzene amination may exceed in these conditions 750%.

http://dx.doi.org/10.1023/B:RUEL.0000037954.57842.70

Keywords

electrophilic amination, hydroxylamine, radical amino cation, radical aromatic substitution